



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/241,673	09/23/2011	Erich J. Plondke	100433	2824

23696 7590 04/03/2017
QUALCOMM INCORPORATED
5775 MOREHOUSE DR.
SAN DIEGO, CA 92121

EXAMINER

YAARY, MICHAEL D

ART UNIT	PAPER NUMBER
----------	--------------

2182

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

04/03/2017

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

us-docketing@qualcomm.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ERICH J. PLONDKE, LUCIAN CODRESCU, MAO ZENG,
SWAMINATHAN BALASUBRAMANIAN, and DAVID J. HOYLE

Appeal 2016-006905
Application 13/241,673
Technology Center 2100

Before ERIC B. CHEN, HUNG H. BUI, and
JOSEPH P. LENTIVECH, *Administrative Patent Judges*.

Opinion for the Board filed by *Administrative Patent Judge*
ERIC B. CHEN.

Opinion Dissenting-in-part filed by *Administrative Patent Judge*
HUNG H. BUI.

CHEN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) from the final rejection of claims 1–29, all the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

STATEMENT OF THE CASE

Appellants' invention relates to determining an extremum, including coupling a reference location identifier and a reference extremum, determining an input extremum of an input data set and a corresponding location identifier, and comparing the input extremum with the reference extremum to determine an output extremum and output location identifier. (Abstract.)

Claim 1 is exemplary, with disputed limitations in italics:

1. A method of determining an extremum in a processing system, the method comprising:
 - storing a reference location identifier and a reference extremum in a storage medium;
 - receiving an input data set comprising two or more data elements from a memory system;
 - determining an input extremum of the two or more data elements of the input data set;*
 - determining a corresponding location identifier of the input extremum; and
 - comparing the input extremum with the reference extremum to determine an output extremum and output location identifier, based on the comparison.

Examiner's Rejections & References

(1) Claims 1–29 stand rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter.

(2) Claims 1–29 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Alidina (US 5,991,785; Nov. 23, 1999) and Roth (US 6,948,056 B1; Sept. 20, 2005.)

ANALYSIS

§ 101 Rejection

We are persuaded by Appellants’ arguments (Reply Br. 2–3) that independent claim 1 complies with 35 U.S.C. § 101 as statutory subject matter.

The Examiner stated that “[c]laim 1 is directed to non-statutory subject matter because the claim(s) as a whole, considering all claim elements both individually and in combination, do not amount to significantly more than an abstract idea.” (Ans. 3.) In particular, the Examiner found that “[t]he reasons these limitations are an abstract idea is they are directed to mathematical relationships/processing/algorithms.” (*Id.*) We do not agree.

In *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347 (2014), the Supreme Court applied the framework as set forth in *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S.Ct. 1289 (2012) for determining whether the claims are directed to patent-eligible subject matter. *Alice*, 134 S. Ct. at 2355. The first step in the analysis is to “determine whether the claims at issue are directed to one of [the judicially-recognized] patent-ineligible concepts.” *Id.* If the claims are directed to a patent-ineligible concept, then the second step in the analysis is to consider the elements of the claims “individually and ‘as an ordered combination’ to determine whether the additional elements ‘transform the nature of the claim’ into a patent-eligible application.” *Id.* (quoting *Mayo*, 132 S.Ct. at 1298, 1297). However, the Federal Circuit has articulated that “the first step in the *Alice* inquiry . . . asks whether the focus of the claims is on the specific asserted improvement in computer capabilities . . . or, instead, on a process that

qualifies as an ‘abstract idea’ for which computers are invoked merely as a tool.” *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335–36 (Fed. Cir. 2016). Accordingly, the Federal Circuit determined, if “the claims are directed to a specific implementation of a solution to a problem in the software arts,” then “the claims at issue are not directed to an abstract idea.” *Id.* at 1339.

In the “Background” section, Appellants’ Specification discloses that “[d]ata processing applications often include functions for determining minimum or maximum values . . . in a given data set” (¶ 2) and that such minimum or maximum values can be determined using a “first approach” (¶ 3) or a “second approach” (¶ 5).

In particular, Appellants’ Specification discloses that the “first approach may utilize instructions to read the data elements from the two dimensional array, one row at a time, and perform a search for an extreme value within each row,” such that

[t]he extreme value can be found by walking through the row, comparing each data element with a running value indicating a current extreme value, and updating the running value if necessary, and wherein the running value at the end of all such comparisons within a row is the extreme value of the row.

(¶ 3.) Alternatively, using the “second approach” an “extreme value may be determined by a pair-wise tree type reduction of extreme values of data elements in the row” (*id.*), as illustrated in Figure 1, such “second approach” including Stages 1–3 (¶¶ 6–8).

However, Appellants’ Specification discloses that both the “first approach” and Stage 3 of the “second approach” suffer from drawbacks when searching for a global extremum (¶ 8), including “reading each row of the two dimensional array and comparing the data elements of the row with

the global extremum to determine which row of the two dimensional array contains the determined global extremum,” such that “intervening read/write operations to any of the rows within the two dimensional array must be held in abeyance until the entire operation is completed” (§ 4).

Accordingly, Appellants’ Specification discloses that “there is a need in the art for techniques which overcome the drawbacks of the first and second approaches, and provide for fast and efficient searching of extreme values in a multi-dimensional array” (§ 9) that is not “computationally intensive and wasteful on system resources” (§ 8).

Appellants’ Specification further discloses the following:

Exemplary embodiments include techniques for fast searching of an extreme value in a data set. Further, embodiments include instructions and architectural support for fast searching of an extreme value in a data set and also efficiently tracking a location identifier or address of the extreme value. Disclosed embodiments *maintain a reference extreme value and its corresponding location identifier during the course of searching for a global extremum in the data set. The reference extreme value and its corresponding location identifier are appropriately updated during the course of the search*, such that a global extremum and the location identifier of the global extremum are almost simultaneously made available at the end of the search, without requiring an additional step of searching through the data set for the occurrence of the global extremum.

(§ 24 (emphases added).) Accordingly, Appellants’ invention “maintain[s] a reference extreme value and its corresponding location identifier during the course of searching for a global extremum in the data set” that “are appropriately updated during the course of the search,” thereby, solving the art recognized problem of determining a global extremum without consuming “intensive” computing resources. Thus, to the extent Appellants’ claimed invention is considered an abstract idea, such claimed invention is a

“specific asserted improvement in computer capabilities” rather than “a process that qualifies as an ‘abstract idea’ for which computers are invoked merely as a tool.” *See Enfish*, 822 F.3d at 1335–36. Accordingly, because “the claims are directed to a specific implementation of a solution to a problem in the software arts,” claim 1 is not directed toward an abstract idea. *See id.* at 1339.

Therefore, we are persuaded by Appellants’ arguments that “[s]imilar to the self-referential table functions at issue in *Enfish*, Appellant’s claims are directed to an improvement of technology related to searching for extrema in a data set and determining the location of an extremum” and “the claim elements are directed to an improvement of existing technology, such as ‘faster search times.’” (Reply Br. 3.)

Thus, we do not agree with the Examiner that claim 1 is directed towards non-statutory subject matter.

Accordingly, we do not sustain the rejection of independent claim 1 under 35 U.S.C. § 101. Claims 2–12 depend from independent claim 1. We do not sustain the rejection of these claims under 35 U.S.C. § 101 for the same reasons discussed with respect to independent claim 1.

Independent claims 13, 24, and 27 recite limitations similar to those discussed with respect to independent claim 1. We do not sustain the rejection of claims 13, 24, and 27, as well as dependent claims 14–23, 25, 26, 28, and 29, for the same reasons discussed with respect to claim 1.

§ 103 Rejection

We are persuaded by Appellants’ arguments (App. Br. 9–10; *see also* Reply Br. 5) that the combination of Alidina and Roth would not have

rendered obvious independent claim 1, which includes the limitation “determining an input extremum of the two or more data elements of the input data set.”

The Examiner found that the data process of Alidina, which processes stored array data to determine a maximum value and a location value in the array data, corresponds to the limitation “determining an input extremum . . . of an input data set.” (Ans. 5.) The Examiner further found that the control unit of Roth, which retrieves M data elements from the array of elements and compares the data elements to M current extreme values, corresponds to the limitation “two or more data elements.” (Ans. 6; *see also* Final Act. 3.) The Examiner concluded that “it would have been obvious . . . to modify the teachings of Alidina, by applying parallel comparison of a plurality of elements, for the benefit of being able to significantly reduce computing time.” (Final Act. 3; *see also* Ans. 6.) We do not agree.

Independent claim 1 recites “determining *an input extremum of the two or more data elements* of the input data set” (emphasis added). One relevant plain meaning for “of” is “a function word to indicate the whole that includes the part denoted by the preceding word.” MERRIMAN-WEBSTER’S COLLEGIATE DICTIONARY 806 (10th ed. 1999). Thus, the limitation “an input extremum of the two or more data elements of the input data set” is interpreted as meaning that the “input extremum” is one data element that is a part of the “two or more data elements of the input data set.” Such an interpretation is consistent with Appellants’ Specification, which discloses that following:

the maximum value of the data elements 204a-204d is computed as the input maximum value 208. In one embodiment, the 16-bit input maximum value 208 of register 204 is computed in a tree

type reduction as shown in FIG. 2. First, the intermediate maximum values 206a/b and 206c/d are computed, such that 206a/b is the maximum value of data elements 204a and 204b, and 206c/d is the maximum value of data elements 204c and 204d.

(¶ 28.)

Roth relates to “array searching operations for a computer.” (Col. 1, ll. 9–10.) Roth explains that “a control unit . . . concurrently compare[s] the data elements to M current extreme values, and update[s] the current extreme values, as well as M references to the current extreme values, based on the comparisons.” (Abstract.) Furthermore, in reference to Figure 3, Roth explains that “processor 2 compares the even element of the pair to a current minimum value for the even elements (302) and the odd element of the pair to a current minimum value for the odd elements (304).” (Col. 3, ll. 5–8.)

Although the Examiner cited to the control unit of Roth, which compares data element to M current extreme members, the Examiner has not provided sufficient evidence to support a finding that Roth teaches the limitation “determining an input extremum of the two or more data elements of the input data set.” In particular, Roth explains that the data elements are compared to M current extreme values, rather than determining an extreme value from among the input data elements. (*See* Abstract; *see also* col. 3, ll. 5–8.)

Thus, we are persuaded by Appellants’ arguments that “even if Roth teaches determining multiple extrema of multiple data elements of multiple sets, nowhere does Roth teach or suggest determining one extremum of multiple input elements or ‘determining an input extremum of the two or more data elements of the input data set’ as recited in Claim 1” (App. Br. 9

(emphasis omitted)) and “Roth does not teach, for example, compar[ing] the retrieved M data elements to one another to determine an input extremum among them” (*id.* at 9–10 (emphases omitted)).

Accordingly, we do not sustain the rejection of independent claim 1 under 35 U.S.C. § 103(a). Claims 2–12 depend from independent claim 1. We do not sustain the rejection of claims 2–12 under 35 U.S.C. § 103(a) for the same reasons discussed with respect to independent claim 1.

Independent claims 13, 24, and 27 recite limitations similar to those discussed with respect to independent claim 1. We do not sustain the rejection of claims 13, 24, and 27, as well as dependent claims 14–23, 25, 26, 28, and 29, for the same reasons discussed with respect to claim 1.

DECISION

The Examiner’s decision rejecting claims 1–29 is reversed.

REVERSED

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ERICH J. PLONDKE, LUCIAN CODRESCU, MAO ZENG,
SWAMINATHAN BALASUBRAMANIAN, and DAVID J. HOYLE

Appeal 2016-006905
Application 13/241,673
Technology Center 2100

Before ERIC B. CHEN, HUNG H. BUI, and
JOSEPH P. LENTIVECH, *Administrative Patent Judges*.

BUI, *Administrative Patent Judge*.

I write separately to voice my disagreement with the majority’s reversal of claims 1–29 under 35 U.S.C. § 101. In particular, the majority concludes that Appellant’s claims are directed to an improvement of technology related to searching for extrema in a data set and determining the location of an extremum” and “the claim elements are directed to an improvement of existing technology, such as ‘faster search times,’ as was the case in *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016).

In my view, claims 1–29 do not pass muster under *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347 (2014) and its progeny, including *Enfish*.¹ The Supreme Court has long held that “[l]aws of nature, natural

¹ See the Federal Circuit’s precedential decision in *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014); *Enfish v. Microsoft*, 822

phenomena, and abstract ideas are not patentable.” *Alice*, 134 S. Ct. at 2354 (quoting *Assoc. for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2116 (2013) (internal quotation marks omitted)). The “abstract ideas” category embodies the longstanding rule that an idea, by itself, is not patentable. *Id.* at 2355 (quoting *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)).

In *Alice*, the Supreme Court sets forth an analytical “framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Id.* (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1296–97 (2012)). The first step in the analysis is to “determine whether the claims at issue are directed to one of those patent-ineligible concepts,” such as an abstract idea. *Id.* If the claims are directed to a patent-ineligible concept, the second step in the analysis is to consider the elements of the claims “individually and ‘as an ordered combination’” to determine whether there are additional elements that “‘transform the nature of the claim’ into a patent-eligible application.” *Id.* (quoting *Mayo*, 132 S. Ct. at 1298, 1297). In other words, the second step is to “search for an ‘inventive concept’—*i.e.*, an element or combination of elements that is ‘sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.’” *Id.* (quoting *Mayo*, 132 S. Ct. at 1294).

Turning to the first step of the *Alice* inquiry, I find claims 1–29 simply

F.3d 1327 (Fed. Cir. 2016); *Bascom Global Internet Services, Inc. v. AT&T Mobility LLC.*, 827 F.3d 1341 (Fed. Cir. 2016); and *McRO Inc. v. Bandai Namco Games America Inc.*, 837 F.3d 1299 (Fed. Cir. 2016).

recite an abstract concept of analyzing data and information. For example, claim 1 recites several functions, including: (i) “storing a reference location identifier and a reference extremum,” (ii) “receiving an input data set comprising two or more data elements,” (iii) “determining an input extremum of the two or more data elements of the input data set” and “a corresponding location identifier of the input extremum”; and (iv) “comparing the input extremum with the reference extremum to determine an output extremum and output location identifier, based on the comparison.” All these functions are abstract processes of collecting, storing, and analyzing information of a specific content. Information as such is intangible. *See Microsoft Corp. v. AT & T Corp.*, 550 U.S. 437, 451 n.12 (2007). Information collection and analysis, including when limited to particular content, is within the realm of abstract ideas. *See, e.g., Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1349 (Fed. Cir. 2015); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014); and *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1370 (Fed. Cir. 2011).

Turning to the second step of the *Alice* inquiry, I find nothing in claims 1–29 that adds anything “significantly more” to transform the abstract concept of collecting, storing, and analyzing information into a patent-eligible application. *Alice*, 134 S. Ct. at 2357. Method claims 1–12 simply recite this abstract concept collecting, storing, and analyzing information. System claims 13–29 simply incorporate a general-purpose processor to perform the abstract concept of collecting, storing, and analyzing information.

However, limiting such an abstract concept of updating data to a

generic purpose process or system recited in Appellants’ claims 13–29 does not make the abstract concept patent-eligible under 35 U.S.C. § 101. Ans. 3. As recognized by the Supreme Court, “the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention.” *See Alice*, 134 S. Ct. at 2358–59 (concluding claims “simply instruct[ing] the practitioner to implement the abstract idea of intermediated settlement on a generic computer” not patent eligible); *see also Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 715–16 (Fed. Cir. 2014) (claims merely reciting abstract idea of using advertising as currency as applied to particular technological environment of the Internet not patent eligible); *Accenture Global Servs., GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1344–45 (Fed. Cir. 2013) (claims reciting “generalized software components arranged to implement an abstract concept [of generating insurance-policy-related tasks based on rules to be completed upon the occurrence of an event] on a computer” not patent eligible); and *Dealertrack, Inc. v. Huber*, 674 F.3d 1315, 1333–34 (Fed. Cir. 2012) (“Simply adding a ‘computer aided’ limitation to a claim covering an abstract concept, without more, is insufficient to render [a] claim patent eligible” (internal citation omitted)).

The majority’s decision to reverse the Examiner’s § 101 rejection is based on the Federal Circuit’s decision in *Enfish v. Microsoft*. In *Enfish*, the Federal Circuit held that claims directed to specific improvements in computer capabilities (i.e., self-referential table for a computer database) are patent-eligible subject matter. For example, *Enfish*’s claim 17 recites:

A data storage and retrieval system for a computer memory, comprising:

means for configuring said memory according to a logical table, said logical table including:

a plurality of logical rows, each said logical row including an object identification number (OID) to identify each said logical row, each said logical row corresponding to a record of information;

a plurality of logical columns intersecting said plurality of logical rows to define a plurality of logical cells, each said logical column including an OID to identify each said logical column; and

means for indexing data stored in said table.

As explained by the Federal Circuit, *Enfish*'s "claims are not simply directed to *any* form of storing tabular data, but instead are specifically directed to a *self-referential* table for a computer database" that "functions differently than conventional data structures" and that is "designed to improve the way a computer stores and retrieves data in memory." *Enfish*, 822 F.3d at 1337–39.

As recognized by the majority, claims "purport[ing] to improve the functioning of the computer itself," or "improv[ing] an existing technological process" might not succumb to the abstract idea exception. *Id.* at 1335 (quoting *Alice*, 134 S. Ct. at 2358–59). However, Appellants' claims 1–29 are not rooted in any type of computer technology; nor do they seek to improve any type of computer capabilities, such as *Enfish*'s "self-referential table for a computer database." Instead, Appellants' claims 1–29 simply recite an abstract concept of collecting, storing, and analyzing information. No practical application of that abstract concept is recited anywhere in Appellants' claims 1–29. In short, these claims are nothing more than "mathematical algorithms" as recognized by the Examiner. Ans. 3.

Because Appellants' claims 1–29 are directed to a patent-ineligible abstract concept, I would affirm the Examiner's rejection of claims 1–29 under 35 U.S.C. § 101 in light of *Alice* and its progeny.